CENTERS FOR DISEASE CONTROL

March 8, 1991 / Vol. 40 / No. 9

MMWR

MORBIDITY AND MORTALITY WEEKLY REPORT

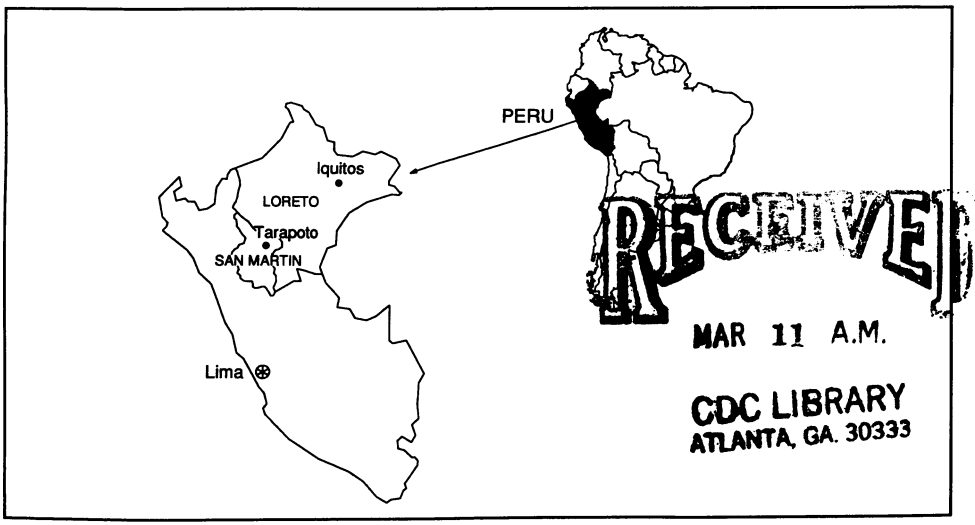
International Notes

Dengue Epidemic — Peru, 1990

From March to July 1990, an epidemic of classical dengue caused by dengue types 1 and 4 (DEN-1 and DEN-4) occurred in Iquitos and the surrounding area of the department of Loreto in the Amazon region of Peru (Figure 1). A smaller outbreak was reported in Tarapoto in the neighboring department of San Martin. Although cases were reported in Peru during 1953–1955 and in 1958 (*1*), the epidemic in 1990 was the first laboratory confirmation of indigenous transmission of dengue in Peru. This report summarizes the preliminary findings of the epidemiologic investigation by the Peruvian Ministry of Health (MOH) and the U.S. Naval Medical Research Institute Detachment (NAMRID), Lima, Peru, which conducted special studies and laboratory confirmation of cases in persons seen at the Peruvian Naval Medical Center, Iquitos, Peru.

The first cases in Iquitos occurred in late March 1990. Common manifestations included fever, headache, and musculoskeletal pain. A case was subsequently

FIGURE 1. Sites of dengue epidemic — Peru, 1990



Dengue Epidemic — Continued

defined according to major and minor criteria (e.g., fever, headache, and musculoskeletal pain and rash, ocular pain, and adenopathy). Predominant manifestations were fever, headache, and malaise (Table 1). Hemorrhagic manifestations, such as bleeding gums, were noted in 6.5% of patients with clinical dengue; no cases of shock syndrome were documented.

Acute-phase blood samples were collected at the Naval Medical Center from patients whose illness met the case definition for dengue. A total of 158 blood specimens were inoculated into cultures of C6/36 mosquito cells and Vero (African green monkey kidney) cells; 58 viral isolates were obtained. Based on indirect fluorescent antibody (IFA) tests, 24 of these isolates were identified as DEN-1 and seven as DEN-4. Identification of the remaining 27 viral isolates is pending. Of 43 paired serum samples analyzed by IFA and hemagglutination inhibition (HI) antibody tests, fourfold or greater rises in antibody to DEN-1 occurred in eight and to DEN-4 in 26; in eight persons, similar increases occurred to both DEN-1 and DEN-4 (HI antibody titer >10,240).

Five of 20 pools of mosquitoes (approximately 25 females per pool) collected with human bait or dry ice in or near Iquitos during the first 3 weeks of the outbreak yielded DEN-1 virus. However, only two of the five pools comprised *Aedes aegypti.* The remaining three pools comprised *Culex amazonensis, Aedeomyia squamipennis,* and an undetermined *Sabethes* species.

A random survey based on a grid plan of houses in early May 1990 indicated that approximately 25% of the 305,000 residents of Iquitos had a febrile illness during the 60 days before the survey. Based on this finding, an estimated 76,000 persons in Iquitos may have experienced a dengue-like illness at that point in the epidemic.

Control measures during the epidemic were constrained by limitations in the availability of medical workers and equipment for spraying insecticide. However, public announcements using local radio, television, and newspapers provided information about the prevention of mosquito breeding.

Reported by: E Colan, MD, J Escamilla, PhD, I Phillips, JT Need, PhD, Naval Medical Research Institute Detachment, US Navy, Lima, Peru. M Rodriguez, L Vasquez, MD, LJ Seminario, MD, Dept of Epidemiology, Ministry of Health of Peru, Lima, Peru. Dengue Br, Div of Vector-Borne Infectious Diseases, Center for Infectious Diseases; Global EIS Program, International Br, Div of Field Epidemiology, Epidemiology Program Office, CDC.

TABLE 1. Symptoms of patients examined at the Naval Medical Center whose illness met the clinical case definition for dengue — Iquitos, Peru, 1990

Symptom	No. (n=217)	(%)	Symptom	No. (n=217)	(%)
Fever	207	(95.4)	Adenopathy*	54	(33.5)
Headache	199	(91.7)	Ocular pain	63	(29.0)
Malaise	177	(81.6)	Pruritus	43	(19.8)
Myalgia	173	(79.7)	Asthenia	43	(19.8)
Arthralgia	168	(77.4)	Altered taste	40	(18.4)
Chills	167	(77.0)	Dermal rash	27	(12.4)
Anorexia	149	(68.7)	Gum bleeding	14	(6.5)
Nausea	110	(50.7)	Vaginal bleeding†	5	(5.0)
Dizziness	80	(36.9)	Epistaxis	6	(2.8)

*Number of patients examined = 161.
†Number of patients examined = 101.

Dengue Epidemic — Continued

Editorial Note: In the 1990 epidemic in Peru, although mosquito pools containing species other than *Ae. aegypti* yielded dengue virus, it is not possible to determine whether other species were actually involved in dengue transmission. Two possibilities exist: 1) one or two mosquitoes of the three other species had taken blood meals from viremic persons but were not involved directly in dengue transmission, or 2) body parts of infected *Ae. aegypti* mosquitoes were inadvertently mixed with the other three species during processing.

Ae. aegypti, the epidemic vector of dengue, was declared eradicated from Peru in 1958 (*1*). In October 1984, reinfestations were detected in Iquitos by MOH officials. In 1985, MOH officials reported a house index (i.e., the percentage of houses inspected that had larval *Ae. aegypti*) of 10%; by 1988, the index had increased to 26%. Serum specimens collected from a random sample of 1015 persons in coastal, mountain, and jungle areas of Peru during 1985–1987 were analyzed by the Evandro Chagas Institute in Belem, Brazil, for HI antibodies to DEN-1, DEN-2, DEN-3, and DEN-4 antigens. Of the 1015 persons tested, DEN-4 antibody was detected in two (0.2%); in both cases, antibody titers were low, and all samples were negative to the other three dengue serotypes (NAMRID, unpublished data).

Dengue appears to be increasing in the Americas, particularly in South America (*2,3*). Although the outbreak in Peru began as one was concluding in Caracas, Venezuela (*4*), the origin of the outbreak in Peru has not been established. Iquitos is a thriving, commercially active city with daily river and air traffic from Brazil, Venezuela, and Colombia. Surveillance and control programs are needed to minimize morbidity and mortality from dengue epidemics.

References

1. Ministry of Health. Guidelines for the prevention and control of dengue. Lima, Peru: Ministry of Health, General Office for Epidemiology, 1990.
2. CDC. Dengue and dengue hemorrhagic fever in the Americas, 1986. MMWR 1988;37:129–31.
3. CDC. Dengue epidemic—Ecuador, 1988. MMWR 1989;38:419–21.
4. Pan American Health Organization. DHF outbreaks in Venezuela. Epidemiol Bull 1990:1117–9.

Epidemiologic Notes and Reports

Update: Acute Allergic Reactions Associated with Reprocessed Hemodialyzers — United States, 1989–1990

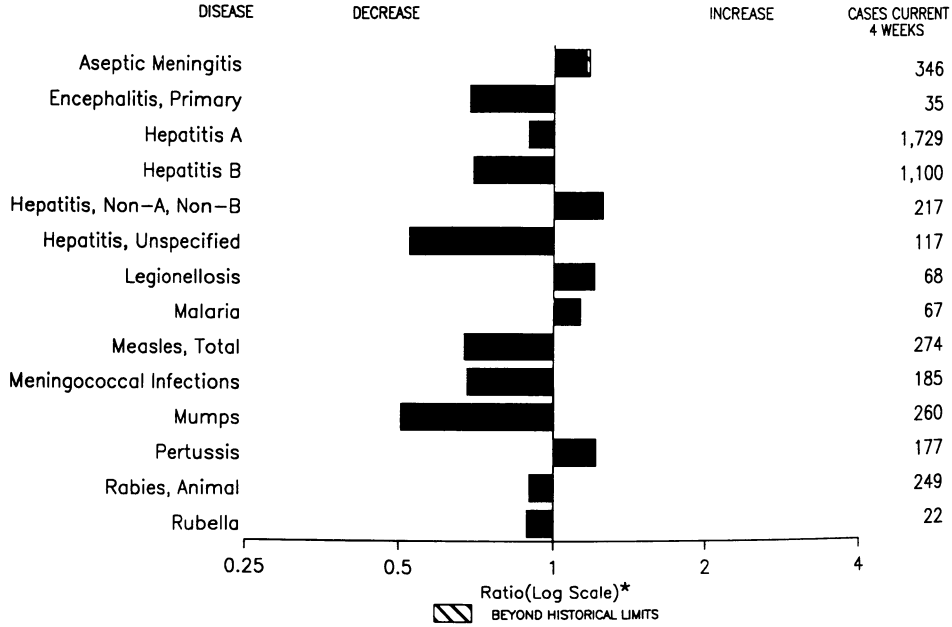
In December 1989, clusters of acute allergic reactions (AARs)* that occurred within 10 minutes of initiation of hemodialysis at one dialysis clinic prompted an epidemiologic investigation; findings of that investigation suggested that AARs were associated with reused dialyzers (*1*). To further characterize the extent of this problem and to identify risk factors for AARS, in January 1990, a questionnaire was mailed to all 1702 Health Care Financing Administration-licensed chronic hemodialysis centers. In March 1990, a telephone questionnaire was administered to all centers reporting clusters† of AARs from January 1 through December 31, 1989, to assess clinical

(Continued on page 153)

*Defined as two or more of the following symptoms in a hemodialysis patient: 1) generalized sensation of warmth; 2) numbness or tingling of the extremities; 3) swelling or fullness in the mouth or throat; and 4) shortness of breath, audible wheezing, and/or chest tightness.

†Defined as two or more patients experiencing AARs within 10 minutes of initiating a hemodialysis treatment with a reprocessed dialyzer in a hemodialysis center.

FIGURE I. Notifiable disease reports, comparison of 4-week totals ending March 2, 1991, with historical data — United States



*Ratio of current 4-week total to the mean of 15 4-week totals (from previous, comparable, and subsequent 4-week periods for the past 5 years). The point where the hatched area begins is based on the mean and two standard deviations of these 4-week totals.

TABLE I. Summary — cases of specified notifiable diseases, United States, cumulative, week ending March 2, 1991 (9th Week)

	Cum. 1991		Cum. 1991
AIDS	6,876	Measles: imported	32
Anthrax	-	indigenous	497
Botulism: Foodborne	1	Plague	-
Infant	9	Poliomyelitis, Paralytic*	-
Other	-	Psittacosis	11
Brucellosis	12	Rabies, human	-
Cholera	-	Syphilis, primary & secondary	7,265
Congenital rubella syndrome	3	Syphilis, congenital, age < 1 year	-
Diphtheria	1	Tetanus	-
Encephalitis, post-infectious	6	Toxic shock syndrome	66
Gonorrhea	93,990	Trichinosis	-
Haemophilus influenzae (invasive disease)	455	Tuberculosis	2,960
Hansen Disease	14	Tularemia	9
Leptospirosis	14	Typhoid fever	53
Lyme Disease	87	Typhus fever, tickborne (RMSF)	13

*No cases of suspected poliomyelitis have been reported in 1991; none of the 6 suspected cases in 1990 have been confirmed to date. Five of the 13 suspected cases in 1989 were confirmed and all were vaccine associated.

TABLE II. Cases of selected notifiable diseases, United States, weeks ending March 2, 1991, and March 3, 1990 (9th Week)

Reporting Area	AIDS	Aseptic Meningitis	Encephalitis		Gonorrhea		Hepatitis (Viral), by type				Legionellosis	Lyme Disease
			Primary	Post-infectious			A	B	NA,NB	Unspecified		
	Cum. 1991	Cum. 1991	Cum. 1991	Cum. 1991	Cum. 1991	Cum. 1990	Cum. 1991	Cum. 1991	Cum. 1991	Cum. 1991	Cum. 1991	Cum. 1991
UNITED STATES	6,876	817	80	6	93,990	118,986	3,983	2,371	520	227	173	87
NEW ENGLAND	323	40	5	-	3,168	3,542	96	172	26	5	20	17
Maine	15	2	2	-	20	44	4	1	1	-	-	-
N.H.	7	2	-	-	41	36	7	11	2	-	1	2
Vt.	6	1	-	-	12	12	4	1	-	-	-	-
Mass.	167	13	1	-	1,167	1,306	54	142	23	3	19	11
R.I.	13	21	-	-	191	185	14	7	-	2	-	4
Conn.	115	1	2	-	1,737	1,959	13	10	-	-	-	-
MID. ATLANTIC	1,964	120	2	3	9,614	13,417	301	174	27	4	52	10
Upstate N.Y.	307	49	2	2	1,610	2,559	200	100	20	-	20	-
N.Y. City	1,033	9	-	-	1,918	6,573	25	6	-	-	3	-
N.J.	471	-	-	-	2,105	2,432	11	9	2	-	5	10
Pa.	153	62	-	1	3,981	1,853	65	59	5	4	24	-
E.N. CENTRAL	575	138	19	2	17,629	24,163	334	287	128	9	26	9
Ohio	85	48	6	1	5,456	7,194	97	70	31	4	13	4
Ind.	48	17	5	1	2,060	2,218	81	48	1	-	3	-
Ill.	306	19	3	-	5,911	7,431	31	5	1	-	-	-
Mich.	91	51	5	-	3,693	5,797	60	103	21	5	9	5
Wis.	45	3	-	-	509	1,523	65	61	74	-	1	-
W.N. CENTRAL	217	58	8	-	5,025	6,446	637	77	38	4	9	1
Minn.	44	10	5	-	504	763	60	5	3	1	2	-
Iowa	23	16	-	-	341	525	13	4	2	-	-	1
Mo.	121	18	-	-	3,109	3,602	124	58	33	2	4	-
N. Dak.	-	-	-	-	-	35	10	-	-	1	-	-
S. Dak.	-	6	3	-	90	40	341	1	-	-	1	-
Nebr.	10	7	-	-	365	247	74	8	-	-	2	-
Kans.	19	1	-	-	616	1,234	15	1	-	-	-	-
S. ATLANTIC	1,634	187	16	1	29,506	34,103	255	582	70	48	20	20
Del.	11	4	-	-	377	447	4	13	1	-	-	4
Md.	165	21	3	-	3,245	3,807	63	78	17	4	6	8
D.C.	131	8	-	-	1,968	1,482	18	20	-	1	-	-
Va.	126	38	3	-	2,379	3,139	34	48	3	36	2	5
W. Va.	8	2	-	-	224	201	5	10	-	3	-	-
N.C.	70	30	7	-	5,680	6,078	47	147	28	-	6	3
S.C.	49	7	-	-	2,344	2,970	8	130	15	-	3	-
Ga.	215	12	2	1	7,502	7,931	24	69	1	-	1	-
Fla.	859	65	1	-	5,787	8,048	52	67	5	4	2	-
E.S. CENTRAL	176	67	4	-	7,706	10,154	39	176	56	2	13	9
Ky.	33	17	2	-	948	1,199	8	44	1	2	7	6
Tenn.	54	16	2	-	2,350	2,964	21	110	52	-	4	2
Ala.	61	23	-	-	2,213	3,845	10	22	3	-	2	1
Miss.	28	11	-	-	2,195	2,146	-	-	-	-	-	-
W.S. CENTRAL	676	47	7	-	10,276	11,845	461	171	13	24	5	1
Ark.	28	25	1	-	1,322	1,588	74	5	1	-	-	-
La.	90	4	1	-	1,865	2,184	28	42	1	1	1	-
Okla.	19	1	3	-	1,083	988	84	48	10	5	4	1
Tex.	539	17	2	-	6,006	7,085	275	76	1	18	-	-
MOUNTAIN	185	37	6	-	1,668	2,691	722	169	27	47	17	1
Mont.	4	1	-	-	14	22	25	19	-	2	-	-
Idaho	3	-	-	-	23	16	10	14	-	-	1	-
Wyo.	3	-	-	-	20	31	39	3	-	-	-	1
Colo.	80	12	1	-	317	792	50	29	9	5	3	-
N. Mex.	11	5	-	-	191	190	236	21	2	18	1	-
Ariz.	37	12	5	-	721	1,087	255	42	4	17	5	-
Utah	11	2	-	-	58	76	61	6	4	5	4	-
Nev.	36	5	-	-	324	477	46	35	8	-	3	-
PACIFIC	1,126	123	13	-	9,398	12,625	1,138	563	135	84	11	19
Wash.	70	-	-	-	641	1,239	98	84	23	5	1	-
Oreg.	28	-	-	-	343	452	70	50	22	2	-	-
Calif.	980	109	13	-	8,112	10,631	938	415	84	76	9	19
Alaska	3	3	-	-	150	217	24	4	5	1	-	-
Hawaii	45	11	-	-	152	86	8	10	1	-	1	-
Guam	-	-	-	-	-	41	-	-	-	-	-	-
P.R.	349	27	-	-	65	235	15	57	12	3	-	-
V.I.	1	-	-	-	72	89	-	2	-	-	-	-
Amer. Samoa	-	-	-	-	-	33	-	-	-	-	-	-
C.N.M.I.	-	-	-	-	-	40	-	-	-	-	-	-

N: Not notifiable U: Unavailable C.N.M.I.: Commonwealth of the Northern Mariana Islands

TABLE II. (Cont'd.) Cases of selected notifiable diseases, United States, weeks ending March 2, 1991, and March 3, 1990 (9th Week)

Reporting Area	Malaria	Measles (Rubeola)					Menin-gococcal Infections	Mumps		Pertussis			Rubella		
		Indigenous		Imported*		Total									
	Cum. 1991	1991	Cum. 1991	1991	Cum. 1991	Cum. 1990	Cum. 1991	1991	Cum. 1991	1991	Cum. 1991	Cum. 1990	1991	Cum. 1991	Cum. 1990
UNITED STATES	142	13	497	14	32	2,866	358	90	530	33	370	528	10	59	66
NEW ENGLAND	11	-	-	-	-	76	39	-	7	5	28	69	-	-	1
Maine	-	-	-	-	-	26	4	-	-	-	4	1	-	-	-
N.H.	1	-	-	-	-	7	6	-	-	1	9	6	-	-	-
Vt.	1	-	-	-	-	-	5	-	-	-	-	2	-	-	-
Mass.	6	-	-	-	-	-	19	-	-	4	15	55	-	-	-
R.I.	2	-	-	-	-	10	-	-	2	-	-	-	-	-	1
Conn.	1	-	-	-	-	33	5	-	5	-	-	5	-	-	-
MID. ATLANTIC	14	-	173	-	-	268	38	14	45	8	50	142	1	3	1
Upstate N.Y.	4	-	-	-	-	171	20	6	21	2	24	116	-	-	1
N.Y. City	3	-	-	-	-	19	-	-	-	-	-	-	-	-	-
N.J.	4	-	3	-	-	13	7	-	-	-	1	9	-	-	-
Pa.	3	-	170	-	-	65	11	8	24	6	25	17	1	3	-
E.N. CENTRAL	8	4	7	-	2	1,378	52	-	58	5	76	146	1	3	4
Ohio	-	-	-	-	1	136	20	-	-	4	34	26	-	-	-
Ind.	1	-	-	-	-	48	5	-	3	-	15	31	-	1	-
Ill.	1	-	-	-	-	575	10	-	36	-	11	45	-	-	4
Mich.	6	4	7	-	-	181	13	-	16	1	13	13	1	2	-
Wis.	-	-	-	-	1	438	4	-	3	-	3	31	-	-	-
W.N. CENTRAL	2	-	-	-	-	96	12	16	27	-	27	18	-	1	-
Minn.	-	-	-	-	-	28	4	-	2	-	11	1	-	1	-
Iowa	1	-	-	-	-	21	1	-	5	-	4	1	-	-	-
Mo.	1	-	-	-	-	47	3	-	2	-	9	12	-	-	-
N. Dak.	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
S. Dak.	-	-	-	-	-	-	2	-	-	-	1	1	-	-	-
Nebr.	-	-	-	-	-	-	1	-	1	-	2	1	-	-	-
Kans.	-	-	-	-	-	-	1	16	17	-	-	1	-	-	-
S. ATLANTIC	40	3	19	-	5	176	66	15	171	2	22	47	-	3	3
Del.	-	3	4	-	-	1	-	-	-	-	-	2	-	-	-
Md.	12	-	-	-	-	20	9	3	54	-	1	18	-	3	-
D.C.	3	-	-	-	-	1	-	-	3	-	-	1	-	-	-
Va.	7	-	-	-	-	7	8	2	12	-	2	4	-	-	-
W. Va.	1	-	-	-	-	-	3	2	5	1	6	5	-	-	-
N.C.	1	-	-	-	-	3	20	1	56	1	9	6	-	-	-
S.C.	4	-	12	-	-	-	5	2	25	-	-	-	-	-	-
Ga.	3	-	-	-	-	1	11	-	5	-	3	7	-	-	-
Fla.	9	-	3	-	5	143	10	5	11	-	1	4	-	-	3
E.S. CENTRAL	1	-	-	-	-	19	30	5	16	3	15	15	-	-	-
Ky.	-	-	-	-	-	-	13	-	-	-	-	-	-	-	-
Tenn.	-	-	-	-	-	12	8	4	8	2	9	4	-	-	-
Ala.	1	-	-	-	-	-	9	1	2	1	6	10	-	-	-
Miss.	-	-	-	-	-	7	-	-	6	-	-	1	-	-	-
W.S. CENTRAL	8	-	-	-	5	90	20	18	71	-	9	2	-	-	-
Ark.	1	-	-	-	5	-	5	-	6	-	-	-	-	-	-
La.	2	-	-	-	-	-	7	1	9	-	6	1	-	-	-
Okla.	1	-	-	-	-	3	2	-	1	-	3	1	-	-	-
Tex.	4	-	-	-	-	87	6	17	55	-	-	-	-	-	-
MOUNTAIN	8	-	64	-	4	54	14	4	27	6	58	47	-	1	-
Mont.	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-
Idaho	-	-	-	-	1	1	3	-	2	-	9	2	-	-	-
Wyo.	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-
Colo.	3	-	-	1	5	3	1	5	5	18	33	-	-	-	-
N. Mex.	1	-	55	-	2	2	3	N	N	1	10	2	-	-	-
Ariz.	4	-	2	-	-	35	3	3	17	-	7	6	-	-	-
Utah	-	-	-	-	-	-	-	-	3	-	10	2	-	-	-
Nev.	-	-	7	-	-	11	-	-	-	-	-	2	-	1	-
PACIFIC	50	6	234	14	16	709	87	18	108	4	85	42	8	48	57
Wash.	5	6	6	14†§	14	9	5	-	8	1	13	8	5	5	-
Oreg.	1	-	-	-	-	32	10	N	N	2	8	6	-	-	-
Calif.	43	-	226	-	2	639	71	15	91	1	46	25	3	42	53
Alaska	-	-	-	-	-	27	1	-	4	-	4	-	-	-	-
Hawaii	1	-	2	-	-	2	-	3	5	-	14	3	-	1	4
Guam	-	U	-	U	-	-	-	U	-	U	-	-	U	-	-
P.R.	-	-	-	-	1	36	3	-	1	-	4	-	-	-	-
V.I.	-	-	-	-	-	-	-	1	2	-	-	-	-	-	-
Amer. Samoa	-	U	-	U	-	-	-	U	-	U	-	-	U	-	-
C.N.M.I.	-	U	-	U	-	-	-	U	-	U	-	-	U	-	-

*For measles only, imported cases includes both out-of-state and international importations.
N: Not notifiable U: Unavailable †International §Out-of-state

TABLE II. (Cont'd.) Cases of selected notifiable diseases, United States, weeks ending March 2, 1991, and March 3, 1990 (9th Week)

Reporting Area	Syphilis (Primary & Secondary)		Toxic-shock Syndrome	Tuberculosis		Tula-remia	Typhoid Fever	Typhus Fever (Tick-borne) (RMSF)	Rabies, Animal
	Cum. 1991	Cum. 1990	Cum. 1991	Cum. 1991	Cum. 1990	Cum. 1991	Cum. 1991	Cum. 1991	Cum. 1991
UNITED STATES	7,265	7,773	66	2,960	3,168	9	53	13	661
NEW ENGLAND	185	320	5	63	51	-	6	2	-
Maine	-	3	3	-	-	-	-	-	-
N.H.	1	26	1	-	1	-	-	-	-
Vt.	1	-	-	-	2	-	-	-	-
Mass.	95	112	1	23	18	-	6	2	-
R.I.	11	1	-	16	12	-	-	-	-
Conn.	77	178	-	24	18	-	-	-	-
MID. ATLANTIC	1,336	1,400	13	712	816	-	7	-	238
Upstate N.Y.	103	102	7	21	88	-	1	-	71
N.Y. City	624	959	-	512	542	-	2	-	-
N.J.	213	290	-	123	95	-	4	-	103
Pa.	396	49	6	56	91	-	-	-	64
E.N. CENTRAL	795	541	11	372	328	1	6	-	6
Ohio	101	94	8	66	46	-	1	-	1
Ind.	16	4	-	15	21	-	-	-	-
Ill.	384	216	1	206	160	-	-	-	1
Mich.	208	155	2	62	89	1	5	-	1
Wis.	86	72	-	23	12	-	-	-	3
W.N. CENTRAL	113	66	15	73	76	1	1	-	98
Minn.	13	18	7	7	15	-	1	-	32
Iowa	14	5	4	15	6	-	-	-	18
Mo.	78	33	4	29	33	1	-	-	2
N. Dak.	-	1	-	2	3	-	-	-	9
S. Dak.	1	-	-	7	4	-	-	-	29
Nebr.	1	2	-	3	7	-	-	-	2
Kans.	6	7	-	10	8	-	-	-	6
S. ATLANTIC	2,247	2,718	4	406	497	-	9	8	182
Del.	21	38	1	6	9	-	-	-	31
Md.	235	218	-	34	42	-	5	1	70
D.C.	125	135	-	33	13	-	-	-	2
Va.	172	134	1	38	40	-	1	-	31
W. Va.	4	2	-	14	8	-	1	-	11
N.C.	326	300	2	60	69	-	-	6	-
S.C.	287	164	-	52	88	-	-	-	7
Ga.	539	696	-	71	69	-	2	1	27
Fla.	538	1,031	-	98	159	-	-	-	3
E.S. CENTRAL	728	601	1	190	218	1	-	2	12
Ky.	13	13	-	51	70	-	-	1	4
Tenn.	323	175	-	-	44	1	-	-	-
Ala.	196	223	1	77	73	-	-	1	8
Miss.	196	190	-	62	31	-	-	-	-
W.S. CENTRAL	1,134	1,172	1	314	396	4	-	1	54
Ark.	69	84	-	30	42	3	-	-	4
La.	343	361	-	66	94	-	-	-	3
Okla.	30	43	1	11	25	1	-	1	18
Tex.	692	684	-	207	235	-	-	-	29
MOUNTAIN	118	154	8	71	52	2	3	-	6
Mont.	1	-	-	-	-	1	-	-	3
Idaho	3	1	-	-	1	-	-	-	1
Wyo.	1	-	-	1	1	1	-	-	-
Colo.	11	12	-	6	-	-	-	-	1
N. Mex.	6	11	3	-	10	-	-	-	-
Ariz.	78	104	2	44	25	-	2	-	1
Utah	2	1	3	13	-	-	-	-	-
Nev.	16	25	-	7	15	-	1	-	-
PACIFIC	609	801	8	759	734	-	21	-	65
Wash.	20	73	-	31	48	-	-	-	-
Oreg.	19	20	-	13	18	-	1	-	1
Calif.	568	696	8	679	625	-	19	-	64
Alaska	2	4	-	4	16	-	-	-	-
Hawaii	-	8	-	32	27	-	1	-	-
Guam	-	-	-	-	9	-	-	-	-
P.R.	47	93	-	15	13	-	-	-	5
V.I.	8	-	-	1	1	-	-	-	-
Amer. Samoa	-	-	-	-	5	-	-	-	-
C.N.M.I.	-	-	-	-	6	-	-	-	-

U: Unavailable

TABLE III. Deaths in 121 U.S. cities,* week ending March 2, 1991 (9th Week)

Reporting Area	All Causes, By Age (Years)						P&I**
	All Ages	≥65	45-64	25-44	1-24	<1	Total
NEW ENGLAND	647	483	94	44	11	15	56
Boston, Mass.	168	111	29	17	5	6	17
Bridgeport, Conn.	45	33	6	5	-	1	6
Cambridge, Mass.	29	23	2	4	-	-	3
Fall River, Mass.	16	12	3	-	1	-	1
Hartford, Conn.	88	68	16	3	-	1	3
Lowell, Mass.	23	16	4	3	-	-	1
Lynn, Mass.	21	17	2	2	-	-	2
New Bedford, Mass.	24	20	3	1	-	-	2
New Haven, Conn.	33	26	3	2	2	-	2
Providence, R.I.	54	43	9	-	-	2	6
Somerville, Mass.	-	-	-	-	-	-	-
Springfield, Mass.	37	28	6	1	2	-	3
Waterbury, Conn.	32	25	3	2	-	2	6
Worcester, Mass.	77	61	8	4	1	3	4
MID. ATLANTIC	2,773	1,787	531	300	69	86	175
Albany, N.Y.	59	39	12	3	3	2	3
Allentown, Pa.	23	15	6	2	-	-	3
Buffalo, N.Y.	104	71	20	2	8	3	9
Camden, N.J.	29	20	3	3	1	2	1
Elizabeth, N.J.	28	16	8	4	-	-	-
Erie, Pa.†	36	29	5	-	-	2	3
Jersey City, N.J.	63	37	16	8	-	2	1
New York City, N.Y.	1,440	881	291	185	38	45	75
Newark, N.J.	77	29	22	23	1	2	5
Paterson, N.J.	39	20	7	7	1	4	3
Philadelphia, Pa.	399	274	70	35	10	10	28
Pittsburgh, Pa.†	72	51	10	1	2	8	3
Reading, Pa.	41	34	6	1	-	-	11
Rochester, N.Y.	129	89	20	14	2	4	12
Schenectady, N.Y.	28	25	3	-	-	-	-
Scranton, Pa.†	30	23	7	-	-	-	1
Syracuse, N.Y.	111	84	14	8	3	2	8
Trenton, N.J.	31	22	5	4	-	-	5
Utica, N.Y.	15	14	1	-	-	-	-
Yonkers, N.Y.	19	14	5	-	-	-	4
E.N. CENTRAL	2,342	1,443	447	236	123	93	124
Akron, Ohio	72	55	7	5	2	3	-
Canton, Ohio	43	31	8	2	2	-	5
Chicago, Ill.	496	194	100	103	73	26	16
Cincinnati, Ohio	130	84	33	6	5	2	16
Cleveland, Ohio	154	94	35	12	5	8	7
Columbus, Ohio	145	89	38	13	1	4	5
Dayton, Ohio	124	84	27	6	1	6	11
Detroit, Mich.	247	142	55	24	13	13	7
Evansville, Ind.	50	38	8	1	1	2	2
Fort Wayne, Ind.	69	49	12	7	1	-	1
Gary, Ind.	25	14	4	4	2	1	2
Grand Rapids, Mich.	67	50	11	1	-	5	4
Indianapolis, Ind.	200	132	40	17	4	7	9
Madison, Wis.	36	26	5	4	1	-	6
Milwaukee, Wis.	146	110	22	9	3	2	13
Peoria, Ill.	60	44	11	3	-	2	3
Rockford, Ill.	57	43	5	5	2	2	4
South Bend, Ind.	57	41	6	5	2	3	4
Toledo, Ohio	90	64	13	4	5	4	5
Youngstown, Ohio	74	59	7	5	-	3	4
W.N. CENTRAL	795	582	136	47	10	20	42
Des Moines, Iowa	64	46	14	2	1	1	4
Duluth, Minn.	25	20	4	-	1	-	3
Kansas City, Kans.	25	17	3	3	1	1	3
Kansas City, Mo.	114	77	30	6	-	1	2
Lincoln, Nebr.	59	44	14	-	-	1	2
Minneapolis, Minn.	168	124	24	11	3	6	7
Omaha, Nebr.	98	80	9	7	-	2	6
St. Louis, Mo.	129	90	18	13	2	6	6
St. Paul, Minn.	61	44	10	5	1	1	6
Wichita, Kans.	52	40	10	-	1	1	3
S. ATLANTIC	1,481	916	299	169	47	49	101
Atlanta, Ga.	164	94	33	25	6	6	8
Baltimore, Md.	278	163	57	44	10	4	34
Charlotte, N.C.	118	84	20	3	2	9	6
Jacksonville, Fla.	140	89	28	18	3	2	16
Miami, Fla.	106	58	27	14	2	5	-
Norfolk, Va.	83	51	14	6	4	8	4
Richmond, Va.	88	62	15	7	3	1	11
Savannah, Ga.	54	36	12	5	-	1	5
St. Petersburg, Fla.	66	50	8	4	1	3	3
Tampa, Fla.	165	108	41	7	5	3	8
Washington, D.C.	192	97	42	35	11	7	6
Wilmington, Del.	27	24	2	1	-	-	-
E.S. CENTRAL	818	535	161	68	30	24	60
Birmingham, Ala.	158	102	30	13	6	7	7
Chattanooga, Tenn.	86	65	13	5	3	-	7
Knoxville, Tenn.	83	51	21	5	-	6	8
Louisville, Ky.	136	95	26	9	2	4	9
Memphis, Tenn.	138	85	29	14	9	1	12
Mobile, Ala.	25	17	3	2	2	1	1
Montgomery, Ala.	49	30	13	4	2	-	6
Nashville, Tenn.	143	90	26	16	6	5	10
W.S. CENTRAL	1,635	981	344	193	58	59	109
Austin, Tex.	61	38	10	10	1	2	2
Baton Rouge, La.	58	44	9	4	1	-	2
Corpus Christi, Tex.	57	47	4	3	-	3	2
Dallas, Tex.	225	121	51	35	10	8	6
El Paso, Tex.	69	41	15	5	4	4	7
Ft. Worth, Tex.	111	77	17	9	4	4	5
Houston, Tex.	492	253	115	87	15	22	45
Little Rock, Ark.	89	53	27	5	1	3	6
New Orleans, La.	76	44	14	11	5	2	-
San Antonio, Tex.	227	145	54	15	7	6	17
Shreveport, La.	74	50	10	6	5	3	12
Tulsa, Okla.	96	68	18	3	5	2	5
MOUNTAIN	724	476	154	55	14	25	63
Albuquerque, N.M.	79	49	18	9	2	1	5
Colo. Springs, Colo.	47	26	12	5	3	1	3
Denver, Colo.	112	74	23	10	1	4	16
Las Vegas, Nev.	133	82	28	11	4	8	9
Ogden, Utah	20	17	2	1	-	-	5
Phoenix, Ariz.	158	111	26	13	3	5	5
Pueblo, Colo.	22	14	5	2	-	1	3
Salt Lake City, Utah	49	28	15	2	1	3	10
Tucson, Ariz.	104	75	25	2	-	2	7
PACIFIC	2,305	1,559	387	226	66	56	142
Berkeley, Calif.	23	20	-	2	1	-	-
Fresno, Calif.	96	67	13	11	1	4	3
Glendale, Calif.	39	35	2	1	1	-	4
Honolulu, Hawaii	101	73	15	8	3	2	9
Long Beach, Calif.	76	47	16	7	3	3	10
Los Angeles, Calif.	767	487	153	79	29	12	32
Oakland, Calif.§	U	U	U	U	U	U	U
Pasadena, Calif.	28	20	5	3	-	-	3
Portland, Oreg.	130	97	19	7	3	4	1
Sacramento, Calif.	203	132	37	21	8	5	25
San Diego, Calif.	167	111	24	21	4	6	17
San Francisco, Calif.	170	104	26	27	6	4	8
San Jose, Calif.	176	123	28	17	3	5	18
Seattle, Wash.	180	130	23	18	4	5	3
Spokane, Wash.	63	49	13	-	-	1	6
Tacoma, Wash.	86	64	13	4	-	5	3
TOTAL	13,520††	8,762	2,553	1,338	428	427	872

*Mortality data in this table are voluntarily reported from 121 cities in the United States, most of which have populations of 100,000 or more. A death is reported by the place of its occurrence and by the week that the death certificate was filed. Fetal deaths are not included.

**Pneumonia and influenza.

†Because of changes in reporting methods in these 3 Pennsylvania cities, these numbers are partial counts for the current week. Complete counts will be available in 4 to 6 weeks.

††Total includes unknown ages.

§Report for this week is unavailable (U).

Hemodialyzers — Continued

manifestations of AARs, the total number of patients at each center, and incidence of AARs. This report summarizes the results of the survey.

Of 1290 (76%) centers that responded to the mailed questionnaire, 762 (59%) reported reusing dialyzers, and 385 (30%) reported not reusing dialyzers; 143 (11%) did not indicate whether they reused dialyzers. Of the centers reusing dialyzers, 32 (4%) reported patients with AARs (median: six AARs per center; range: 2–40 AARs per center) associated with reprocessed dialyzers. Of the 1290 centers, 38 (3%) reported patients who had experienced anaphylactic-like reactions with new, unused dialyzers; 16 (42%) of the 38 were centers that reported not reusing dialyzers.

Analysis of treatment characteristics and reprocessing practices of centers reusing dialyzers indicated that AAR clusters with reprocessed dialyzers were not associated with the type of disinfectant product, the reprocessing method (manual or automated), or type of dialysate (bicarbonate, acetate, or both). Based on multivariate analysis, however, the risk for clusters of AARs with reprocessed dialyzers was higher with use of a specific heparin product (odds ratio [OR] = 3.1; 95% confidence interval [CI] = 2.3–3.8) and with washing the hemodialyzer blood compartment with either bleach or hydrogen peroxide (OR = 2.5; 95% CI = 1.7–3.3).

In September 1990, a follow-up telephone survey found that, following modification of dialyzer reprocessing practices because of AARs, only two (6%) of the 32 centers that had reported clusters of AARs again reported AARs. Of the 32 centers, six stopped dialyzer reuse for patients who had experienced AARs, six changed the type of hemodialyzer membrane, five changed disinfectant products, and five discontinued washing hemodialyzer blood compartments with hydrogen peroxide; the remaining 10 centers (including the two centers where patients continued to experience AARs with reprocessed dialyzers) modified other dialyzer reprocessing practices. No changes were made in the use of the heparin product.

Reported by: GB Miller, Jr, MD, State Epidemiologist, Virginia Dept of Health. J Wilber, MD, Acting State Epidemiologist, Georgia Dept of Human Resources. Office of Compliance, Center for Devices and Radiologic Health, Food and Drug Administration. Hospital Infections Program, Center for Infectious Diseases, CDC.

Editorial Note: In the United States, reuse of disposable hemodialyzers for the same patient is a common practice: from 1977 through 1988, the proportion of centers that reused dialyzers increased from 18% to 68% (*2*). Reprocessed dialyzers have long been associated with outbreaks of infection with a variety of microorganisms and with higher incidence of pyrogenic reaction than have first-use dialyzers (*3–5*); however, clusters of AARs associated with reprocessed dialyzers had not been previously described.

Anaphylactic-like reactions in some patients undergoing hemodialysis with first use of a dialyzer have been associated with different dialyzer membranes and residual amounts of ethylene oxide (*6,7*). Although the clinical manifestations of patients with AARs associated with reprocessed dialyzers are similar to those described for the "first use syndrome," an allergenic substance and the immunologic mechanism causing clusters of AARs with reprocessed dialyzers has not been defined. AARs associated with hemodialysis should be reported by physicians through state health departments to the Epidemiology Branch, Hospital Infections Program, Center for Infectious Diseases, CDC; telephone (404) 639-3407.

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Hemodialyzers — Continued

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Fatal Carbon Monoxide Poisoning in a Camper-Truck — Georgia

On December 27, 1990, three children, aged 6, 10, and 11 years, died as a result of carbon monoxide (CO) inhalation while riding in the back of their parents' pickup truck, which had a camper shell cover. The family was returning overnight to Georgia from Mississippi, and the children were sleeping in the back of the truck. After 50 miles of travel, they stopped at a service station; the children did not complain of headache or other problems. During a second stop 250 miles further, the children appeared to be asleep. On arrival at their destination in Georgia, following a total drive of 550 miles, the children could not be aroused; resuscitation attempts were unsuccessful. The parents and two younger children riding in the truck cab were asymptomatic.

Autopsy examinations revealed that the three children had carboxyhemoglobin (COHb) levels of 15%–20%, 23%–28%, and 31%–36% and that cerebral edema was present in each. No evidence was found of other cause(s) of death. COHb levels were not measured in the parents and the two other children.

An inspection of the 1970 truck by the Georgia Bureau of Investigation found that the muffler had been replaced, but the original tailpipe was not securely joined to the muffler. Several holes in the wall of the truck bed behind the cab allowed fumes leaking from the muffler to enter the enclosed bed. In addition, the camper shell cover was attached to the truck without a gasket, and the rear door of the cover was loose.

Reported by: J Brown, Georgia Bureau of Investigation; T Young, MD, Fulton County Medical Examiner's Office, Atlanta; J Wilber, MD, Acting State Epidemiologist, Div of Public Health, Georgia Dept of Human Resources. Air Pollution and Respiratory Health Activity, Div of Environmental Hazards and Health Effects, Center for Environmental Health and Injury Control, CDC.

Editorial Note: Death from CO poisoning associated with vehicles is entirely preventable. The three deaths described in this report were caused by the combination of an aging vehicle, a defective exhaust system, and passengers being transported in an inadequately ventilated space.

Any moving vehicle with a vertical rear tailgate or door (e.g., a station wagon or pickup truck with a camper shell cover) creates negative air pressure behind it. Because of this vacuum, opening the rear window of a camper or station wagon can result in high concentrations of exhaust fumes entering the vehicle. Holes in the body of the vehicle or leaks around windows or doors may also allow fumes to enter the passenger compartment.

Carbon Monoxide Poisoning — Continued

Of 68 deaths attributed to CO poisoning in vehicles in Maryland during 1966–1971, the implicated vehicles were considerably older (mean: 7.6 years) than the total sample of registered cars (mean: 4.4 years) ($p<0.01$) (*1*). Of the 68 deaths, 51 (75%) occurred in cars that had a defective exhaust system and/or holes in the fender panels, floor, or trunk. Thirty-three (49%) deaths occurred among persons with measurable blood alcohol levels; in 18 (26%) of the 68, blood alcohol levels were >0.1 mg/dL. Most deaths occurred in parked cars in which the motor was running to provide heat (*1*).

The relation between COHb levels and clinical manifestations varies. The COHb levels in the children in this report were lower than levels generally present in survivors of CO poisoning (however, resuscitation attempts may have lowered the COHb levels before samples were obtained).

Since 1968, the average quantity of CO produced by new cars has been reduced by >90%, largely because of engineering improvements to comply with Clean Air Act regulations. Although a primary goal of the regulations is to reduce ambient CO in urban areas, a collateral benefit is increased safety for persons exposed to automobile exhaust fumes in enclosed places. The 1990 amendments to the Clean Air Act should result in further reduction of CO emissions by mandating the introduction of oxygenated fuels and more advanced pollution control systems (*2*).

CO production by vehicles can be minimized by regular preventive maintenance, inspection of exhaust systems, and emissions testing. Use of leaded gasoline in cars with catalytic converters or bypassing the pollution-control systems will result in production of higher levels of CO and nitrogen oxides. Annual inspections of vehicles should include an examination for rust holes or defects in the body or floor that could permit exhaust fumes to enter the passenger compartment.

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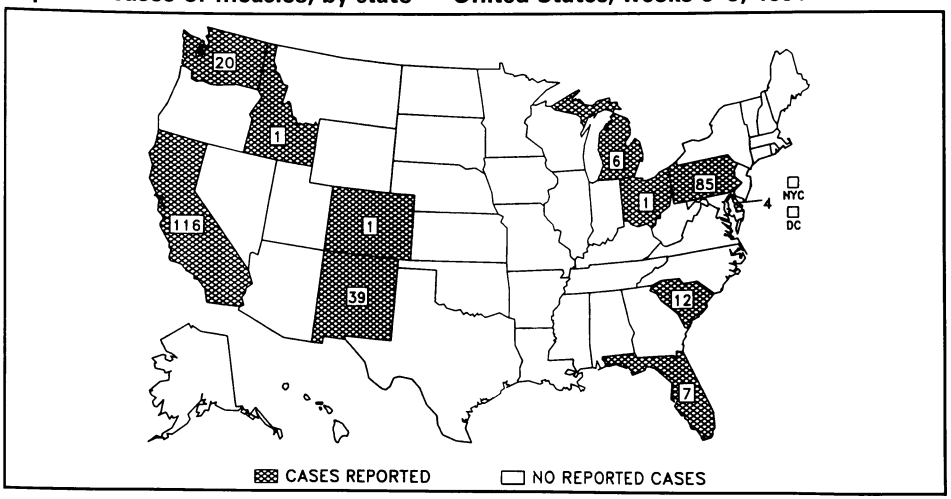
Reported cases of measles, by state — United States, weeks 6–9, 1991



The *Morbidity and Mortality Weekly Report* is prepared by the Centers for Disease Control, Atlanta, Georgia, and is available on a paid subscription basis from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402; (202) 783-3238.

The data in this report are provisional, based on weekly reports to CDC by state health departments. The reporting week concludes at close of business on Friday; compiled data on a national basis are officially released to the public on the succeeding Friday. Accounts of interesting cases, outbreaks, environmental hazards, or other public health problems of current interest to health officials, as well as matters pertaining to editorial or other textual considerations should be addressed to: Editor, *Morbidity and Mortality Weekly Report*, Mailstop C-08, Centers for Disease Control, Atlanta, Georgia 30333; telephone (404) 332-4555.

☆U.S. Government Printing Office: 1991-531-130/22054 Region IV

HHS Publication No. (CDC) 91-8017